

Committee on Resources

Witness Testimony

Department of the Army
Complete Statement
of
JOHN E. VELEHRADSKY
Director of Engineering And
Technical Services
U. S. Army Corps of Engineers
North Pacific Division
Before The
Subcommittee on Water and Power
Of the
Committee on Resources
U.s. House of Representatives
Hearing On
Bonneville/Northwest Power Outage
November 7, 1996
Los Angeles, California

Mr. Chairman and distinguished members of the Subcommittee, I am John Velehradsky, Director of Engineering and Technical Services, North Pacific Division, U.S. Army Corps of Engineers. I am pleased to be here today representing Mr. Martin Lancaster, the Assistant Secretary of Army for Civil Works. In my current position, I am responsible for technical direction of the planning, design, construction, operations, readiness and real estate activities associated with Corps of Engineers water resource management activities in the Columbia River basin. In my testimony, I will briefly describe the Corps hydroelectric generation facilities in the Northwest and how they are managed. I will address the outage of August 10, 1996, as it relates to the Corps operations and management. I will also explain the actions that the Corps is taking since the incident to help this multi-jurisdictional power system respond to such abnormal occurrences.

The Corps of Engineers operates and maintains 21 hydroelectric projects in the Western Systems Coordinating Council (WSCC) service area. The WSCC is an association of 91 power systems in 14 western States, two Canadian Provinces, and part of one Mexican State that promotes electric system reliability and provides a forum for coordinating the operating and planning activities of its members. The maximum generation capacity at the 21 Corps dams is 12,937 Megawatts which represents approximately 24.5% of the hydropower capacity in the Northwest. One of these 21 Corps projects is at the McNary Dam located about 292 miles upstream from the mouth of the Columbia River and near Umatilla, Oregon. As a result of the voltage depression in the system on August 10, the generators at McNary tripped off in order to protect the equipment.

Power generated at the Corps projects is marketed and transmitted to customers by another Federal agency, the Bonneville Power Administration. Many factors affect how these dams and reservoirs are managed to produce power. The Columbia River Treaty regulates how water and power are traded between the U.S. and Canada, and the Pacific Northwest Coordination Agreement specifies how power is produced and shared

among regional utilities. There are also many non-power uses for the Columbia River that affect how the Corps facilities are operated. The dams and reservoirs that the Corps operates are multipurpose projects that balance the demand for hydropower with other legitimate uses for the water including navigation, flood control, water supply, recreation, and fish passage. All of these factors are considered in the development of operation plans for the reservoirs in the Columbia River system.

The Columbia River and its tributaries are home to salmon and sturgeon that annually migrate the rivers moving past the series of dams that have been constructed in their path. During critical fish passage periods, from April through August, water control and hydropower operations are managed to avoid jeopardy to salmon and sturgeon that are protected under the Endangered Species Act, and to mitigate impacts to other important fish and wildlife resources. To facilitate fish migration, extra releases of water are allowed to bypass the generators at carefully timed intervals. This activity requires close coordination among the Corps water managers, Bonneville Power Administration's dispatchers, and power plant operators.

Following the power disturbance that occurred on August 10, 1996, the WSCC released findings concerning the July 2-3 and August 10, 1996, disturbances. The Council's findings as they relate to Corps operations are paraphrased as follows:

- power system experienced depressed transmission system voltage prior to McNary tripping;
- McNary generators tripped off sooner than would have been expected based on power system studies.
- The level of generator voltage (reactive) support available in the Hanford area was inadequate to prevent system collapse; and
- The North American Electric Reliability Council recommendations in "Survey of Voltage Collapse Phenomena" need to be implemented.

After this incident, the Corps performed its own assessment of the performance of the generation equipment. We found that the McNary units performed as originally commissioned by the manufacturer. During the period of depressed transmission system voltage just prior to the system shutting down, McNary provided voltage support above machine design capacity for about five minutes. Eventually, however, this was insufficient to overcome the losses elsewhere in the system and the generators tripped off.

The 13 McNary generating units shut down in a self-protective mode in response to the major voltage depressions that were occurring in the transmission lines. The automatic tripping of the McNary generators is a safety measure that protects the equipment during such abnormal fluctuations in voltage.

While we found that equipment performance was generally consistent with our expectations, we also learned that the power system voltage in the McNary area was depressed below any level anticipated placing a higher than expected demand on the McNary units. As a result, the McNary units tripped off sooner than we had expected. We do not know that, had the units stayed on line a few minutes longer, the ultimate result of the incident would have been any different.

Although the tripping of the McNary units was only one of the problems associated with the outage, we have identified a few improvements we can make that will help us respond if we are faced with a similar event in the future. These measures respond to the WSCC's findings and recommendations and our program for improving the availability of generation and equipment reliability. We are making some adjustments to

the McNary and other units that will improve their response to an impending voltage collapse in the system. We are improving coordination among Bonneville Power Administration, WSCC, and the Corps to assure that everyone involved is aware of the capability of the Corps equipment in operation.

These measures that the Corps is taking will not by themselves prevent a future incident like the one we just experienced. But they will assure that the Corps operated and maintained facilities are more responsive to the power system's future requirements. Together with steps that can be taken by other players in this power network, the whole system will be more reliable.

Mr. Chairman, this completes my testimony. I would be happy to respond to questions.

###